Differential Effects of a Military Parenting Program on Child Internalizing and Externalizing Behavior: A Latent Profile Analysis

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Abstract

Some children who experience a parental deployment evince high rates of internalizing and externalizing behavior in the years following that parent's return home. This dissertation explored the risk for mental health symptoms in military children in the years following a parent's deployment, as well as the risk factors and outcomes associated with different profile membership. In the first phase, I studied heterogeneity in children's internalizing symptoms and externalizing behavior among 336 military youth who experienced a parental deployment since 2001 using a finite number of discrete mental health profiles with latent profile analysis (LPA), as well as risk factors associated with membership to different risk profiles. Results indicated that current parental mental health problems were associated with child membership in the higher risk profile relative to the low risk profile, but that deployment was not significantly associated with profile membership. In the second phase, I assessed whether parent assignment to a preventive parenting intervention developed for military families, After Deployment Adaptive Parenting Tools intervention (ADAPT; Gewirtz, Pinna, Hanson, & Brockberg, 2014) was associated with improvement in child internalizing and externalizing behavior at one year follow-up, and whether differential treatment effects emerged according to a child's mental health profile at baseline. Results showed significantly lower anxiety and conduct problems for the intervention group relative to the control group that differed according to baseline profile membership.

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Since the beginning of the Global War on Terror in 2001, over 2.7 million U.S. Service members have been deployed in service of the wars in Iraq and Afghanistan (Tanielian, Karney, Chandra, & Meadows, 2014). The Global War on Terror has resulted in longer and repeated deployments for members of the all-volunteer forces (Hosek, Kavanagh, & Miller, 2006). The recurrence and duration of deployments have especially affected National Guard and Reserve (NG/R) Service members. In contrast to Active Duty Service members, who serve full time in the military, NG/R Service members serve part-time, working primarily in civilian jobs while drilling for one weekend a month and two weeks of annual training a year until they are given orders to report for full-time Active duty service (Griffith, 2017). These differences are important to consider given the evidence that NG/R members may endorse more mental health concerns following a deployment than Active duty members (e.g., Lane, Hourani, Bray, & Williams, 2012; Milliken, Auchterlonie, & Hoge, 2007). Given that nearly half of those who have deployed are parents (Department of Defense, 2010), these difficulties have the potential to interfere with Service members' ability to parent effectively following a deployment. Deployment is not only difficult for the Service member, but for his/her spouse and children as well. Spouses have to manage daily frustrations (i.e., car and house repairs, emergency medical incidents) alone while their spouse is deployed, and have reported increasing trepidation in anticipation of the difficulties associated with reintegration with each subsequent deployment (Patzel, McBride, Bunting, & Anno, 2013). Children of deployed Service members have to adjust to new routines during deployment and again when their parent returns, creating uncertainty about their exact role in the family system.

Additionally, military children are acutely aware of changes in both their deployed and nondeployed parent, which can make reintegration more difficult to navigate than the deployment itself (Huebner, Mancini, Wilcox, Grass, & Grass, 2007). Consequently, there is accumulating evidence that children who have experienced a parental deployment may be at greater risk for negative outcomes, including behavioral problems (e.g., Foran, Eckford, Sinclair, & Wright, 2017), mood disorders (e.g., Hisle-Gorman et al., 2015), and substance use (e.g., Gilreath et al., 2013). To date, there is conflicting evidence on the risk factors that contribute to this increase in negative outcomes, with some studies suggesting it is the effect of the deployment itself that increases risk (e.g., Nicosia, Wong, Shier, Massachi, & Datar, 2017; Pfefferbaum, Houston, Sherman, & Melson, 2011), while others found no such connection (e.g., Lucier-Greer, O'Neal, Arnold, Mancini, & Wickrama, 2014; Mustillo, Wadsworth, & Lester, 2016). One reason for this discrepancy may be that rather than impacting child adjustment directly, deployment may instead negatively impact parental mental health.

Theoretical Foundation

Family stress models (e.g., Conger & Elder, 1994) provide a process by which stressful family transitions ultimately affect child functioning. These models posit that major stressors, such as economic hardship and divorce, impact families first by increasing parental distress. This increased distress leads to parental mental health problems and marital conflict that both negatively affect parents' ability to parent their children effectively (i.e., through the use of effective discipline, positive encouragement,

and appropriate monitoring), which, in turn, leads to increases in child emotional and behavioral problems.

Social Interaction Learning theory (SIL; Patterson, DeBaryshe, & Ramsey, 1990) provides the mechanism (coercive parent/child interactions) for how negative parent/child interactions lead to child emotional and behavioral problems in families who have experienced major stressors: when parents are stressed, they are more likely to initiate coercive interactions with their children through coercive discipline and inconsistent follow-through (i.e., punishing a child screaming at a grocery store when told they can't buy their favorite candy one time, but not punishing them the next time the behavior occurs). Over time, these patterns tend to strengthen as children exhibit increasing levels of antisocial behavior, leading to many negative outcomes throughout childhood, adolescence, and adulthood (Patterson, 1982) including substance abuse, deviant peer associations, and academic failure (e.g., Dodge, Greenberg, & Malone, 2008; King, Iacono, & McGue, 2004).

Family stress models were initially developed to account for the effect of financial hardship on child adjustment, but has been recently expanded to include deployment as a family stressor: a randomized controlled trial found that parenting practices mediated the relationship between parental PTSD following a deployment and child adjustment (Gewirtz, Degarmo, & Zamir, 2017b). To date, existing studies have sought to assess the effect of deployment on children with single disorders alone (i.e., depression, conduct problems) or on pre-determined constellations of adjustment (i.e. child functioning as indicated by behavior problems and prosocial behaviors). However, studies have yet to

assess whether different profiles of mental health exist among children in military families, including groups of children who exhibit co-occurring disorders (i.e., depression and conduct problems) as well as those with single disorders. This is critical information because it is well-documented that children with co-occurring disorders demonstrate significantly worse outcomes than those with single disorders (e.g., Nottelmann & Jensen, 1999), but also that these children demonstrate greater improvement following a parent-focused intervention than children with a single disorder (e.g., Beauchaine, Webster-Stratton, & Reid, 2005; Kazdin & Whitley, 2006). This suggests that treatment may differentially affect child outcomes based on a baseline mental health profile that has yet to be identified in a sample of military children.

This dissertation will seek to establish if different profiles of mental health exist in a sample of military children who have experienced a parental deployment, as well as the correlates and outcomes associated with profile membership following parent assignment to an evidence-based parenting intervention adapted for military families who have experienced a deployment, After Deployment Adaptive Parenting Tools (ADAPT; e.g., Gewirtz, Pinna, Hanson, & Brockberg, 2014).

Overview of Research Phases

In this dissertation, I present a person-centered analysis of mental health symptoms in military children in the years following a parent's deployment, as well as the correlates and outcomes associated with profile membership. I have divided the dissertation into two phases. In the first phase, I conducted a latent profile analysis (LPA; Collins & Lanza, 2010) to assess heterogeneity in children's (N = 336) internalizing and

externalizing behavior. I then assessed which deployment related variables were associated with children's membership in different profiles, hypothesizing that profiles characterized by co-occurring children's mental health symptoms from multiple domains would be positively associated with greater levels of current parental PTSD symptoms, but not with the length of total number of deployments.

In the second phase, I tested for differential treatment effects on child internalizing and externalizing behavior at one-year follow-up according to the profiles established in phase I following family assignment to the ADAPT intervention. I hypothesized that random assignment to ADAPT would result in differential treatment effects according to children's profile membership at baseline, with those assigned to the highest risk profiles showing the greatest improvements in internalizing and externalizing behavior at one-year follow-up relative to the control group.

Phase I: Externalizing and Internalizing Symptoms in Military Youth Following Parental Deployment: A Latent Profile Analysis

It is estimated that as many as 1 in 5 children in the United States experience a mental health disorder in a given year, resulting in serious difficulties at home, in school, and in peer relationships (Perou et al., 2013). These childhood emotional and behavioral problems, including internalizing symptoms such as anxiety and depression and externalizing behaviors such as conduct problems and aggression, have been shown to affect competence, functioning and overall adjustment into adulthood (Bornstein, Hahn, & Hayness, 2010; Dodge et al., 2008; Masten et al., 2005). A key risk factor in the development of psychopathology in children is the experience of environmental stressors (Garmezy & Rutter, 1985), including divorce, maltreatment, and parental deployment (Cicchetti & Toth, 1995; Fergusson & Horwood, 2001; Gewirtz, Degarmo, & Zamir, 2017).

Since the beginning of the Global War on Terror (GWOT) in 2001, United States Service members have experienced longer and more frequent deployments than in previous conflicts (Hosek et al., 2006). This has resulted in over 700,000 children experiencing the prolonged absence of a parent (U.S. Deparment of Defense, 2011). While many military families demonstrate resilience following a deployment (e.g., Card et al., 2011), some families struggle to adapt, with mounting evidence that Service members (e.g., Quartana et al., 2014), spouses (e.g., Breslau & Brown, 2016), and their children (e.g., Hisle-Gorman et al., 2015) may struggle with increased mental health symptoms.

Effect of Deployment on Parental Mental Health

Combat deployments are stressful for both service members and their at-home spouses, with research from the recent conflicts suggesting a steady increase in the use of mental health services by Service members (e.g., Hoge, Auchterlonie, & Milliken, 2006; Quartana et al., 2014; Seal et al., 2009) and their spouses (e.g., Breslau & Brown, 2016; Eaton et al., 2008; Mansfield et al., 2010) since 2001. Posttraumatic stress disorder (PTSD) is prevalent among Service members returning from combat: The U.S. Department of Veterans Affairs estimates that PTSD affects 11% of veterans of the war in Afghanistan and 20% of veterans of the war in Iraq (U.S. Department of Veterans Affairs, 2014), with one study finding that spouses evinced similar levels of mental health symptoms as returning Service members (Eaton et al., 2008). PTSD has previously been linked to lower levels of parenting satisfaction and behaviors in Veterans following combat (e.g., Cohen, Zerach, & Solomon, 2011; Gewirtz, Polusny, DeGarmo, Khaylis, & Erbes, 2010), and there is ample evidence of the lasting negative effects of Vietnam veterans' PTSD on their spouses and children (e.g., Glenn et al., 2002; Jordan et al., 1992; Samper, Taft, King, & King, 2004).

Effect of Deployment on Children's Mental Health

Research on the mental health of military children since 2001 has indicated that children of deployed parents experience more internalizing symptoms (Mustillo et al., 2016; Pexton, Farrants, & Yule, 2017) and more externalizing behavior (Foran et al., 2017; Gorman, Eide, & Hisle-Gorman, 2010) than either civilian children or military youth who did not experience a parent's deployment during the same period. However,

most of the studies that found increased psychopathology in military children were conducted during or shortly after (i.e., less than one year) a parental deployment (e.g., Foran et al., 2017; Pexton et al., 2017), when one would expect the greatest incidence of adjustment problems.

Results have been mixed when testing a direct association between parental deployment and increased psychopathology in children. While some studies have found an association between the amount of time a parent was deployed and children's emotional and behavioral problems (e.g., Nicosia et al., 2017; Pfefferbaum et al., 2011), others have found no association between parental deployment and child psychopathology (e.g., Lucier-Greer et al., 2014; Mustillo et al., 2016).

Family stress models (e.g., Conger & Elder, 1994) suggest that stressful events or situations, such as divorce, poverty, or deployment, impact children's mental health through their effect on parents' functioning. These models suggest that stressful situations negatively impact the emotions and behaviors of parents, increasing the risk for parental emotional problems. This leads to a disruption in parenting practices, thereby increasing the likelihood of angry or hostile interactions with other family members, which ultimately threatens the quality of family relationships and places children at risk for elevated adjustment problems (Conger & Elder, 1994). According to this model, deployment would not be directly associated with children's negative mental health outcomes. Instead parents' current functioning would be expected to be associated with an increase in child mental health symptoms. Posttraumatic stress disorder (PTSD) has been consistently implicated in poor parenting practices, including being less emotionally

available and viewing ones children more negatively than parents without PTSD (e.g., van Ee, Kleber, & Jongmans, 2015). Indeed, in one study that assessed National Guard Soldiers PTSD symptoms one month prior to returning home from a deployment in Iraq and again one year later, increases in PTSD symptoms during the reintegration period were associated with a greater number of perceived parenting challenges at one-year follow-up (Gewirtz et al., 2010).

Previous studies utilizing family stress models have shown pathways linking family stressors to both internalizing and externalizing behavior problems through the stressor's impact on parenting behaviors (Conger et al., 1992). It stands to reason that both pathways may be activated in a child in relation to poorer parent functioning, however, previous research on the mental health of military children has not attempted to address both pathways at once.

To date, the majority of research on the mental health of military youth has taken a variable-centered approach, describing associations between the duration of a parents' deployment and children's mental health (e.g., Lester et al., 2010). This assumes that the relationships among variables and outcomes is homogenous across all members of a population (Laursen & Hoff, 2006). However, it is not always the case that relationships among variables are consistent across all individuals. A person-centered approach identifies groups of individuals who share a particular attribute, allowing an evaluation of whether differential relationships exist between variables and outcomes depending on one's group membership (Laursen & Hoff, 2006). It may be the case that some of the children included in prior analyses of the effect of parental deployment on child

internalizing and externalizing behavior exhibited both sets of symptoms, which previous research would suggest carries a poorer prognosis than those suffering from only one condition (Nottelmann & Jensen, 1999) and may be more or less related to deployment or parental mental health. However, without a pattern-based approach to analysis, there is no way to know to what extent co-occurring psychopathology is a concern with military youth as well as what correlates are associated with varying combinations of mental health symptoms in these children.

There is broad agreement that incorporating multiple informants increases the reliability and validity of psychological assessments in identifying psychopathology in the absence of a single "gold standard" measure of impairment (e.g., Kraemer et al., 2003; Piacentini, Cohen, & Cohen, 1992). Problems that occur in multiple settings (i.e., at home, at school) usually signify a more serious and stable problem (Campbell, Shaw, & Gilliom, 2000), suggesting that multiple informants from a variety of settings may better capture true problem severity (Kagan, Snidman, McManis, Woodward, & Hardway, 2002). Furthermore, there is recognition that rather than searching for consensus among informants, it may be more important to identify the right informants for a particular set of symptoms (Kraemer et al., 2003). For example, it is generally accepted that adults are better informants of observable behavior (i.e., acting out, lying), while children are better informants of their own internal state (i.e., anxiety, depression) (Achenbach, 1991; DiBartolo & Grills, 2006; Piacentini et al., 1992; Silverman & Eisen, 1992). While parents, particularly mothers, are most often used as the reporters on their children's behavior, there is evidence that teachers contribute significant information

during diagnostic assessments of children (Verhulst, Koot, & Van der Ende, 1994). In line with current best practices, this study also sought to identify key informants of child behavior, including a composite score of child externalizing behavior comprised of mother, father, and teacher report, and child-reported internalizing symptoms.

The Present Study

The present study sought to explore heterogeneity in internalizing symptoms and externalizing behavior among military children using a finite number of discrete mental health profiles using latent profile analysis (LPA; Collins & Lanza, 2010). Due to the exploratory nature of LPA, the number and exact nature of classes is not known prior to engaging in an exploratory class enumeration process; however, previous research suggests that several potential patterns are likely to emerge, including youth who have a single reported difficulty, as well as youth with co-occurring internalizing and externalizing behavior. In line with previous research, co-occurring difficulties will be considered a sign of greater impairment (Nottelmann & Jensen, 1999).

There are two primary research questions for this study: (1) what are the most common and distinctive profiles of internalizing symptoms and externalizing behavior among a sample of military youth? (2) How are these profiles associated with deployment related risk factors, including the number of deployments, total number of months spent deployed, and parental PTSD symptoms? The military child population likely contains identifiable subgroups, each with considerably different correlates and mental health outcomes. Based on previous literature on children at risk for mental health disorders (e.g., Connell & Bullock, 2008), I expect several subgroups to emerge: (1) a

normative class that scores less than one standard deviation above the mean on all the mental health indicators (2) an internalizing-only class (3) an externalizing-only class and (4) a co-occurring internalizing/externalizing class. Based on a family stress theory approach to the effect of deployment on military children as well as prior evidence of the effect of parental PTSD, but not deployment, on military children's maladjustment (Gewirtz et al., 2017b), I hypothesized that profiles characterized by co-morbid mental health symptoms (for example, profile 4 above) would be positively associated with higher levels of parental PTSD symptoms, but not with the number of times or total number of months a child experienced a parental deployment.

This exploratory study makes several key contributions to the field concerning our understanding of mental health among children of US military service members who have deployed. Rather than attempting to separate the effects of internalizing symptoms and externalizing behavior, a person-centered approach allows the examination of these problems as they co-occur (Chung, Flaherty, & Schafer, 2006). Furthermore, the use of multiple informants increases the likelihood of accurately identifying children exhibiting internalizing symptoms and externalizing behavior. The resulting profiles can be used to determine what factors put a child at greater risk of belonging to an at-risk profile, and provide an opportunity to test family stress models as they relate to deployment within an alternative type of analysis.

Method

Participants and Procedures

Data were drawn from the randomized controlled ADAPT study. Participants were recruited through extensive outreach efforts with the Minnesota Army National Guard, Air National Guard, and local reserve units. The primary mode of recruitment was through presentations by ADAPT staff at every reintegration event during the recruitment period (2011-2014). All soldiers returning from deployment were required to attend these sessions one month, two months, three months, and one year after returning from an overseas deployment. Participants were also recruited through a variety of other methods, including (a) mass mailings from the Minneapolis Veterans Affairs Medical Center; (b) social media (e.g., Facebook, Twitter); (c) print and local media (e.g., newspaper, local news); and (d) through word of mouth. To be included in the study, families were required to have at least one child living with them between the ages of four and 12, and at least one parent who had deployed since 2001 to OEF, OIF or OND.

Families were directed to an online screener where, if eligible, they could consent to participate in the study. After consenting, they were automatically transferred to a HIPAA-compliant website to complete the first online survey. Study staff then contacted families by email or telephone to schedule an in-home assessment, during which staff collected self-report, observational, and physiological data on each parent and one target child within the eligible age range. Each parent received a $25 gift card for completing the online survey and each family received an additional $50 gift card for completing the in-home assessment; children received a small gift. Following their baseline assessment, families were randomized to participate in the 14-week parenting intervention or to a

services-as-usual control condition, with follow-up interviews conducted at 6-, 12-, and 24-months post-baseline.

The current analyses were based on the questionnaire data collected at baseline, which included reports from 336 National Guard and Reserve (NG/R) families in Minnesota. Data were collected from multiple informants, including 313 mothers, 294 fathers, 264 teachers, and 336 children. The majority of the 336 families (n = 272) had two parents participate in the study together, of which nearly 95% were married to each other. The length of marriage ranged from 1 to 28 years (M = 9.75 years, SD = 5.3 years), with an average of 2.34 children in the household (SD = 0.96).

The oldest child within the study age range was selected as the target child for the study. About half of the target children were female (53.3%), with an average age of 8.33 years at baseline (SD = 2.48 years). The majority of children were White (79.2%), 2.1% were Black, 1.8% Asian, 5.1% mixed race, and 2.4% other, while 6% were identified as Hispanic. The mean age of mothers participating was 35.67 years (SD = 5.89 years) and for fathers was 37.76 years (SD = 6.54 years). The majority of mothers (92.7%) and fathers (88.4%) were White, while 2.2% of mothers and 5.1% of fathers were Black, 1.5% of mothers and 2.4% of fathers were Asian, 2.2% of mothers and 2% of fathers were mixed race, and 3.1% of mothers and 2.9% of fathers identified as Hispanic. Almost half of the households (43.5%) reported an annual income between $40,000 and $79,000, with 13.8% earning less than $39,000 per year, 28.2% earning between $80,000 and $119,999 per year, and 14.5% earning over $120,000 per year. The majority of parents deployed with the Army National Guard (59%), while others deployed with the Army

(12.9%), Air National Guard (10.7%), Navy (6.6%), Air Force (2.8%), and Marine Reserves (0.3%). Only one parent deployed since 2001 in 86.7% of families, while both parents deployed in the remaining 13.3% of families. Just over half of parents (51.2%) deployed more than once for an average of 1.73 deployments (*SD* = 1.16). On average, the last parental deployment a child experienced occurred 33 months prior to the baseline interview (*SD* = 29.9 months).

Measures

The present study included reports of child behavior problems collected from mothers, fathers, teachers, and children as well as covariates relating to deployment and child demographic factors.

Externalizing behavior. Child externalizing behavior was indicated using three subscales from the Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004). The BASC-2 is a widely used broadband measure of child psychopathology and has demonstrated high reliability and validity (Reynolds & Kamphaus, 2004; Weis & Smenner, 2007). BASC-PRS and BASC-TRS subscales utilize developmentally appropriate questions to tap into the same underlying construct. Items were rated on a four-point Likert scale of frequency (*0 = never, 1 = sometimes, 2 = often, and 3 = almost always*). The number of questions in each subscale varied by developmental stage and reporter, ranging from eight to 14 items. Teachers (BASC-TRS) and parents (BASC-PRS) of children 4-11 years old were asked to evaluate the frequency of the target child's behaviors in the domains of aggression ("hits other children,"), conduct problems ("steals,") or hyperactivity ("is unable to slow down"). Reliability

coefficients were sufficient for the report of children's behavior for aggression (teachers, α = .86; mothers, α = .81; fathers, α = .84), conduct problems (teachers, α = .84; mothers, α =.81; fathers, α = .83), and hyperactivity (teachers, α = .94; mothers, α =.85; fathers, α = .83). Teachers and parents of children 12 years and older were also asked to evaluate the frequency of the target child's behaviors in the domains of aggression ("hits other adolescents,") conduct problems ("uses illegal drugs,") and hyperactivity ("is easily distracted.") Reliability coefficients were adequate for the report of adolescent's behavior for aggression (teachers, α = .87; mothers, α = .87; fathers, α = .83), conduct problems (teachers, α = .75; mothers, α = .85; fathers, α = .72), and hyperactivity (teachers, α = .93; mothers, α = .80; fathers, α = .65). Normed-referenced scores (*T* scores) were computed for each reporter on each of the three subscales in order to merge the different aged versions together for analysis. The *T* scores for mother, father, and teacher reports were then averaged in order to produce a single hyperactivity, aggression, and conduct problems score for each child. In the event that a mother, father, or teacher report was missing, a score was computed based on the average of the remaining one or two reporters.

Internalizing symptoms. Child internalizing behavior was indicated using child report on two subscales from the BASC-2 at baseline. Different versions of the child Self Report of Personality (SRP) were administered according to child age in order to tap into the same underlying construct in a developmentally appropriate manner. Children 12 years and older completed the SRP-Adolescent (SRP-A), while children 8-11 years old completed the SRP-Child (SRP-C). Sample items included: "I feel depressed," "I worry

when I go to bed at night," and "sometimes I want to hurt myself." Items were rated on a four-point Likert scale of frequency (*0 = never, 1 = sometimes, 2 = often, and 3 = almost always*). Children 4-7 years old completed the SRP-interview (SRP-I), designed to be read out loud by an interviewer for children who cannot yet read. Sample items included: "I cry a lot," "I always worry about everything," and "I get nervous a lot." Items were rated "yes" or "no." The number of questions in each subscale varied by reporter age, ranging from 10 to 13 items. Reliability was adequate for the SRP-I (anxiety, $\alpha = .80$; depression, $\alpha = .76$), the SRP-C (anxiety, $\alpha = .86$; depression, $\alpha = .78$), and the SRP-A (anxiety, $\alpha = .61$; depression, $\alpha = .72$) Normed-referenced scores (t-scores) were then computed in order to merge the different aged versions of each subscale together.

Covariates.

Child covariates. Child covariates included child gender (1 = *male,* 2 = *female)* and child age, calculated from his/her date of birth.

Deployment covariates. Deployment covariates included the total number of deployments a parent experienced since 2001 and the total number of months spent deployed, coded in 6-month increments (0 = *Never deployed* to 7 = *37+ months).* If both parents experienced deployments, the total number of times deployed and total number of months deployed were summed. Parental PTSD was included to assess parental mental health symptoms using the Posttraumatic Stress Disorder Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a 17-item self-report questionnaire that assesses the presence of PTSD symptoms in the last month according to the criteria set

forth in the Diagnostic and Statistical Manual of Mental Disorders (4th ed. *DSM-IV*; American Psychiatric Association, 1994). Both a military (PCL-M) and civilian (PCL-C) version are available: The PCL-M includes questions about trauma experienced while serving in the military. Sample items include the experience of, "Feeling upset when something reminded you of a stressful military experience" and "Trouble remembering important parts of a stressful military experience." The PCL-C includes questions about other experiences of trauma. Sample items include the experience of, "repeated, disturbing memories, thoughts, or images of a stressful experience from the past" and "trouble remembering important parts of a stressful experience from the past?" Response options were 0 = *Not at all*, 1 = *A little bit*, 2 = *Moderately*, 3 = *Quite a bit*, and 4 = *Extremely*. All items were summed to compute a composite score of post-traumatic stress symptoms, with higher scores indicating a greater number of PTSD symptoms present (mother $\alpha = .91$, father $\alpha = .95$).

Missing Data and Power to Detect Effects

Across the five indicators for the latent profiles, missing data ranged from 1.2% for the externalizing variables to 10.4% for the internalizing variables. Given that a composite average of mother, father, and teacher report was used to compute the three externalizing indicators, one or two reporters could be missing and a score would still be computed for a child's aggression, conduct problems, and hyperactivity. Missing data typically occurred if a teacher chose not to participate, or in the case of families where only one parent participated. Child reported internalizing reports were missed when a child was too young to understand the questions or when an interview needed to be

shortened to accommodate a family situation. When data are missing at random (MAR) unrelated to the study outcome, research suggests it is better to use all available data rather than resorting to pairwise deletion (Schafer & Graham, 2002). Independent pairwise t-tests between children with complete data on all five indicators and those missing data showed no statistically significant differences between the two groups on any variables except child age, which was expected given the most common reason internalizing reports were missed was because of child age as described above. In order to obtain reliable estimates, Mplus requires that the proportion of available data for each variable be at least .10 (Muthén & Muthén, 1998-2012). The proportions for each variable were all above .82 in the present study, thereby meeting this assumption. Given that the MAR assumption was met, missing data were handled using full information maximum likelihood (FIML) estimation under the EM algorithm, which uses all available information to estimate the missing values based on the existing observed values in the data.

In a Monte Carlo simulation study of the final determination of the number of classes in a latent class analysis, Nylund, Asparouhov, and Muthén (2007) demonstrated that there is ample power with samples greater than 200 to distinguish between three classes of unequal size with eight measurement indicators. Given that the ADAPT sample exceeds 300 children and that only five measurement indicators were used, this provides evidence that there is sufficient power to detect meaningful profile differences.

Analytic Plan

Latent profile analysis. To answer the first research question regarding common profiles of child mental health, LPA was conducted in Mplus 7.2 (Muthen & Muthen, 1998-2012). LPA is a person-centered analytic technique that allows for the modeling of unobserved population heterogeneity based on response patterns for multiple indicators (Masyn, 2013). Profiles of internalizing symptoms, indicated by anxiety and depression, and externalizing behavior, indicated by conduct problems, aggression, and hyperactivity were modeled including child age and gender as covariates during model formation due to documented gender differences and the wide range of child ages included in the sample (e.g., Card, Stucky, Sawalani, & Little, 2008; Sterba, Prinstein, & Cox, 2007). Because no single criterion yet exists for determining the optimal number of classes for a given population, latent class enumeration and model building were conducted according to a systematic framework proposed in detail by Masyn (2013). Starting with a one-class solution, classes were added until the resulting model was not well identified, evidenced by a failure to replicate the best log likelihood across random sets of start values. Optimal fit was determined based on several measures of relative and absolute fit, including the Akaike information criterion (AIC; Akaike, 1987), Bayesian information criterion (BIC; Schwarz, 1978), the consistent Akaike information criterion (CAIC; Bozdogan, 1987), and the approximate weight of evidence criterion (AWE; Banfield & Raftery, 1993), where lower values signify better model fit, as well as the adjusted Lo-Mendell-Rubin likelihood ratio test (LMR-LRT; Lo, Mendell, & Rubin, 2001), where a failure to reject the null indicates there is no difference in model fit between the current k model and the K+1 model. Additional classification indices,

including the average posterior class probability ($AvePP_K$), the odds of correct classification (OCC_k) and the final class sample sizes were then considered in order to determine class homogeneity and separation. The best model was determined based on the fit criteria listed above as well as on a substantive assessment of the practical utility of the classes after they were identified and named (Masyn, 2013).

Multinomial logistic regression. In order to answer the second research question and evaluate the relationship between mental health profiles and military-affiliated risk factors, multinomial logistic regression was used to relate class membership to the total number and length of parental deployments and baseline parental PTSD symptomatology in a multinomial logistic regression analysis using a modified 3-step procedure (R3STEP multinomial regression; see figure 4) whereby individuals were classified into their most likely latent profile according to their estimated posterior class probabilities (Asparouhov & Muthén, 2012). This resulted in odds ratios that, when significantly less than 1.0, indicated decreased odds of membership in a latent profile relative to the normative reference profile.

Results

Means, standard deviations, and correlations are presented in Table 1. Model fit information is presented in Table 2. Models with 1-6 profiles were considered, with two candidate models drawn for further investigation based on the fit statistics. Given that the AIC, BIC, CAIC, and AWE never reached a minimum score, an "elbow" plot was examined in order to determine diminishing gains in model fit (Masyn, 2013), which began with the two-profile model. According to the adjusted LMR-LRT, the most

parsimonious model was the three-class model. The structures of the two- and three-class model were then selected as candidate models and further examined in order to determine which profile provided the most practical utility. The three-profile model was determined to be the most compelling, as this solution added a meaningful third profile of high-risk children that was distinct from the first two profiles. Despite the small percentage of the sample classified to the highest risk group (4%), classification indices (see Table 3) indicated that the three-profile model had adequate separation between profiles resulting in highly differentiated groups that had a high degree of within-group homogeneity in externalizing and internalizing scores.

Table 1

Descriptive Statistics and Correlations of Measures with Child's Internalizing and Externalizing Behavior

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Times Deployed	1.7	1.2	-	-	-	-	-	-	-	-	-	-
2. Months Deployed	3.9	1.9	.62**	-	-	-	-	-	-	-	-	-
3. PCL–Father[a]	29.9	12.4	-.03	.12*	-	-	-	-	-	-	-	-
4. PCL–Mother[a]	27.3	9.7	-.03	.01	.16**	-	-	-	-	-	-	-
5. BASC–Anxiety	55.1	12.0	.02	.08	.06	.04	-	-	-	-	-	-
6. BASC–Depression	50.3	7.8	.07	.10	.11	.12*	.68**	-	-	-	-	-
7. BASC–Hyperactivity	53.4	8.6	.11	.02	.20**	.13*	.16**	.28**	-	-	-	-
8. BASC–Aggression	50.9	7.6	.01	-.08	.16**	.16**	.13*	.21**	.64**	-	-	-
9. BASC- Conduct Problems	50.6	6.8	.02	-.00	.19**	.11	.21**	.27**	.63**	.69**	-	-
10. Child Age	8.33	2.5	.10	.11*	-.07	-.06	.26**	-.08	-.12*	-.10	-.16**	-
11. Child Gender	-	-	-.02	.01	-.02	0.03	-.03	-.12*	-.27**	-.21**	-.16**	-.04

[a] Posttraumatic Stress Disorder Checklist; *$p < .05$; **$p < .01$, ***$p < .001$

Table 2

Results of the Latent Profile Enumeration and Measures of Absolute and Relative Fit of Latent Profiles among Military Children (N = 336)

	AIC[a]	CAIC[b]	BIC[c]	AWE[d]	LMR-LRT[e] (*p* value)
1 Class	13435.55	13440.07	13489.03	13442.57	-
2 Class	11043.44	11079.00	11112.09	11084.50	326.20 (0.40)
3 Class	10830.85	10889.44	10930.02	10897.94	223.78 (<.05)
4 Class	10745.63	10827.25	10875.31	10838.75	99.10 (0.13)
5 Class	10706.48	10811.13	10866.67	10825.63	53.99 (0.27)
6 Class	10651.53	10779.22	10842.24	10796.72	69.46 (0.17)

[a] Akaike Information Criteria (AIC). [b] Consistent Akaike Information Criterion (CAIC). [c] Bayesian Information Criteria (BIC). [d] Approximate Weight of Evidence Criterion (AWE). [e] Lo-Mendell-Rubin likelihood ratio test (LMR-LRT).

Table 3
Model Classification Diagnostics of the 3-profile Solution among Military Children (N = 336)

3-class	E_k^a = .83			
Class k	π_k^b	$mcaP_k^c$	$AvePP_K^d$	OCC_k^e
Class 1	0.50551	0.50149	0.934	13.84
Class 2	0.45394	0.45672	0.831	5.92
Class 3	0.04054	0.04179	0.935	340.44

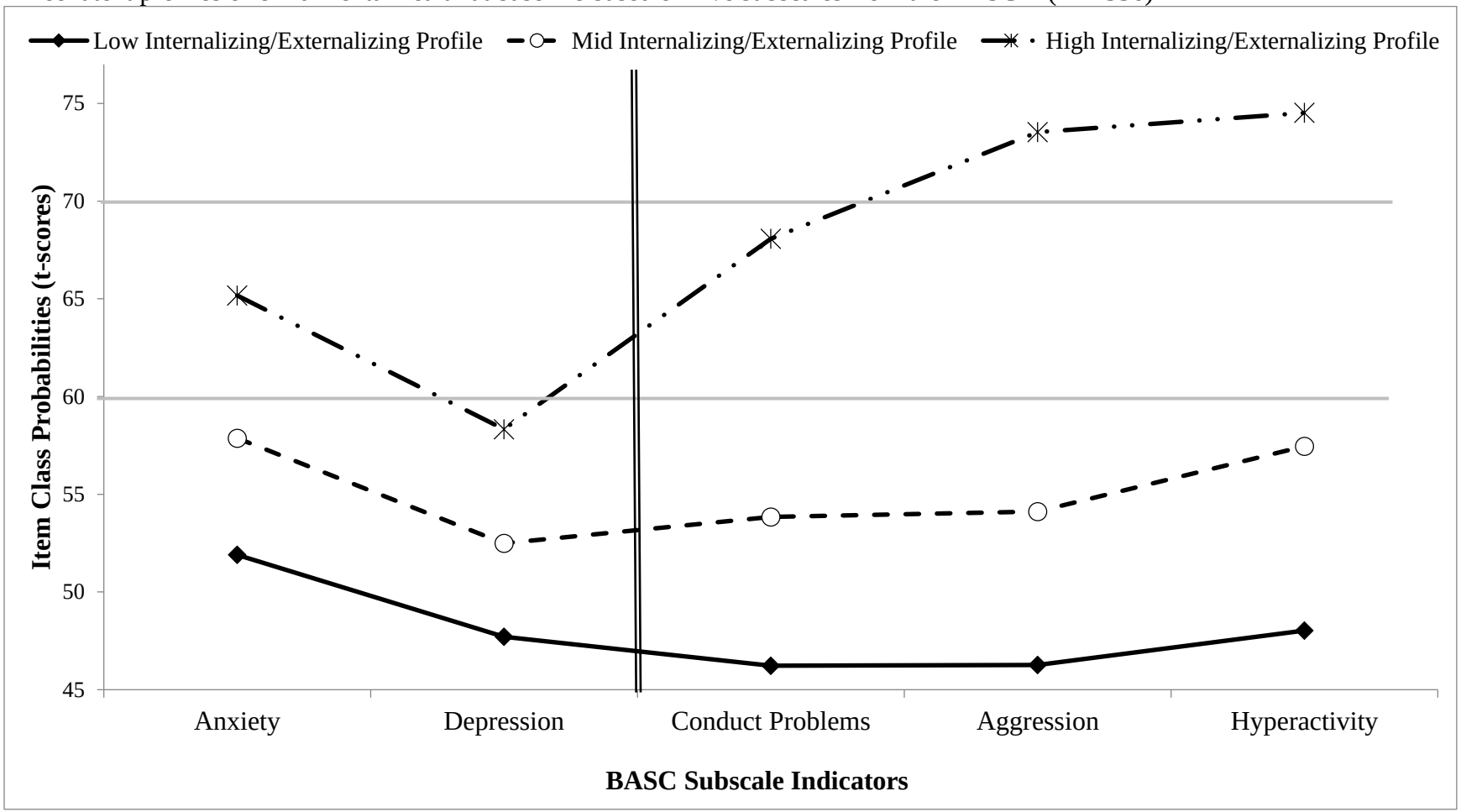
[a] Relative entropy (E_k). [b] Model estimated proportion for class k (π_k). [c] Modal class assignment proportion for class k ($mcaP_k$). [d] Average posterior probability for class k ($AvePP_K$). [e] Odds of correct classification (OCC_k)

Description of the Three Latent Profiles

The three-profile solution of military children's mental health is presented in Figure 1. The hypothesis that four sub-groups would emerge, representing a normative group, an internalizing only group, an externalizing only group, and a co-occurring internalizing/externalizing group, was partially confirmed, with no profiles emerging representing a single disorder alone. The first latent profile (50.1%), *Low Internalizing/Externalizing,* included children who were more than one standard deviation below the cut-off for modest risk behavior (60+) on four of the five indicators of internalizing and externalizing behavior (excluding anxiety). The second latent profile (45.7%), *Mid Internalizing/Externalizing,* included children who were less than one standard deviation below the cut-off for modest risk behavior on all five indicators. The third latent profile (4.0%), *High Internalizing/Externalizing,* included children who scored above the cut-off for modest risk behavior (60+) on four of the five indicators

(excluding depression), and above the cut-off for significant risk behavior (70+) on two of the externalizing indicators, hyperactivity and aggression.

Figure 1
Three latent profiles of child mental health at baseline based on five subscales from the BASC-2 (N = 336)



Note. The Low Internalizing/Externalizing profile included 168 people (50.1%), the Mid Internalizing/Externalizing profile included 153 people (45.7%), and the High Internalizing/Externalizing profile included 14 people (4.0%).

Military-Affiliated Characteristics Associated with Child Mental Health Profiles

Four multinomial logistic regressions were conducted to examine if military-affiliated risk factors, including parental deployment and parental PTSD, were associated with child mental health profiles. Model parameters are presented in Table 4 using the High Internalizing/Externalizing profile as the reference group.

The hypothesis that profiles characterized by co-occurring mental health symptoms would be positively associated with higher levels of parental PTSD symptoms, but not with the number of times or total number of months a child experienced a parental deployment was confirmed. Relative to the High Internalizing/Externalizing profile, children in the Low Internalizing/Externalizing profile had significantly lower odds of having a parent that exhibited PTSD symptoms (mothers, odds ratio [OR] = 0.96, p <.05; fathers, OR = 0.95, p < .05). However, there were no significant differences in parental PTSD symptoms found between the Mid Internalizing/Externalizing profile and the High Internalizing/Externalizing profile. Furthermore, neither the number of times deployed nor the total number of months deployed was significantly associated with the probability of membership in either the low or mid internalizing/externalizing profile relative to the high internalizing/externalizing profile.

Table 4

Odds of Latent Profile Membership among Four Models of Military-Affiliated Risk Factors

	Low internalizing/externalizing profile versus high internalizing/externalizing profile			Mid internalizing/externalizing profile versus high internalizing/externalizing profile		
	B	*SE*	OR (95% CI)	*B*	*SE*	OR (95% CI)
Model 1 (n = 315)						
Number of times deployed	0.03	.020	1.03 (0.71-1.40)	0.09	0.19	1.10 (0.80-1.51)
Model 2 (n = 314)						
Total months deployed	-0.01	0.16	0.99 (0.77-1.28)	-0.11	0.16	0.89 (0.69-1.22)
Model 3 (n = 287)						
Father's PCL score at baseline	-0.04**	0.07	0.96 (0.93-0.99)	-0.02	0.02	0.98 (0.95-1.01)
Model 4 (n = 305)						
Mother's PCL score at baseline	-0.05**	0.03	0.95 (0.91-0.99)	-0.04	0.02	0.97 (0.93-1.00)

Note**.** *OR* = odds ratio. *CI* = confidence interval. ** $p < .05$.

Discussion

This study utilized a person-centered analytic approach to explore heterogeneity in mental health profiles among a sample of children of deployed military service members and assessed whether deployment related variables were differentially associated with membership in each profile. Using LPA, three distinct profiles of mental health were identified, which were, in turn, uniquely related to military variables. Results indicated that both mother and father PTSD symptoms were meaningful correlates of membership in the lowest risk profile relative to the highest risk profile, but did not significantly differentiate the Mid Internalizing/Externalizing profile from the High Internalizing/Externalizing profile. There were no significant differences among profiles relating to duration or instances of parental deployment. These results are discussed in detail below.

Profile Characteristics

As expected, a profile in which internalizing symptoms and externalizing behavior co-occurred was identified (High Internalizing/Externalizing), typified by children scoring in the moderate to significant risk range on all of the internalizing and externalizing indicators except for depression. Contrary to our initial hypothesis, no risk profiles emerged for either internalizing symptoms alone or externalizing behavior alone. Instead, the final two profiles represented levels of internalizing and externalizing behavior considered within the normal range: one was typified by internalizing and externalizing scores at or below the mean (Low Internalizing/Externalizing), and the other was characterized by internalizing and externalizing scores that were within a half standard deviation of modest risk behavior (Mid Internalizing/Externalizing), but still

below the cut-off. This is likely due to ADAPT representing a sample of largely middle-income, well-educated, and married parents already at lower risk for parenting problems and ensuing child adjustment issues.

Associations between Child Mental Health and Military Variables

Notably, among this sample of military children who experienced a parental deployment, nearly all (96%) were identified by a profile typified by emotional and behavioral symptoms within the normative range. This varies from previous reports of increased child mental health problems both during and shortly following a parental deployment (e.g., Hisle-Gorman et al., 2015; Mustillo et al., 2016), but is in line with previous reports of the overall resilience shown by military families whether in times of war or peace (e.g., Park, 2011). This finding may be due to a combination of factors: first, the utilization of multiple reporters in the indication of externalizing behavior required confirmation of problem behavior from multiple individuals in a child's life in order for a child to be scored at moderate or significant risk, resulting in a conservative estimate of externalizing behavior within the sample. However, the children identified as within the moderate or significant risk range were almost certainly exhibiting true externalizing behavior, ensuring that the High Internalizing/Externalizing class included children demonstrating the behaviors intended. Second, this sample represents a wider range of time following a parental deployment than previous studies of mental health in military children. While most previous studies have included criteria excluding families who are more than one year out from a parental return from a deployment (e.g., Flake, Davis, Johnson, & Middleton, 2009; Lester et al., 2010), only 31% of children in the ADAPT sample experienced a parental deployment in the last 12 months, with an average of

almost three years since the last overseas deployment. This suggests that the deleterious downstream effects of deployment on children's mental health may diminish over time, with the vast majority of military children exhibiting resilience and adaptability.

The hypothesis that parental mental health, indicated by current parental PTSD symptoms, and not deployment would be associated with children's mental health, was confirmed. Results indicated that the only meaningful differences between the classes was that those assigned to the Low Internalizing/Externalizing profile were significantly less likely to have a mother or father with elevated PTSD symptoms than those in the High Internalizing/Externalizing profile. This suggests that, in line with family stress theory, deployment is not necessarily directly implicated in children's adjustment problems, rather, parents' current mental health may play a more meaningful role in child adjustment during reintegration, confirming previous findings (Gewirtz et al., 2017b). These findings underscore the importance of providing supportive programs for Service members and their spouses following a deployment, as doing so is likely to benefit military children.

Limitations and Future Directions

This study had a few limitations. First, the use of cross-sectional data means causation cannot be inferred. Given this limitation, I was unable to test whether parental PTSD acts as a mediator between deployment and child mental health. Future work should assess the effect of deployment related variables on children's mental health and potential mediators of the relationship across multiple time points in order to determine the relationships between variables. Second, the relatively low incidence of children

exhibiting mental health symptoms at baseline means that effects might not have been detected, including profiles typified by only internalizing or externalizing behavior. Future studies should obtain a larger sample size in order begin to parse out differences between co-occurring disorders and single disorders. Third, the sample consisted of mostly White, higher-earning families who may have already been at lower risk for exhibiting adjustment problems following a deployment. As a result, these findings may not generalize to all military families. Future research should attempt to replicate these findings across more diverse samples. Fourth, parental PTSD was not measured for non-deployed parents based on trauma related to experiencing previous deployments, so there is no way to know if the PTSD symptoms endorsed by these parents were a result of experiencing a spousal deployment or due to other traumatizing experiences in parents' lives. Future studies should endeavor to assess deployment-related trauma in at-home spouses in order to determine to what extent mental health symptoms following a spouses' return home are related to the deployment itself. Finally, the broad age range of children included in the sample covered multiple developmental stages, making it difficult to fully account for the differences in behavioral problems seen in a five-year-old versus a 12-year-old. Future studies should attempt to target more specific age ranges determined according to developmental stages in order to parse out age-related differences in emotional and behavioral problems.

Conclusion and Implications

A person-centered analysis was utilized to identify three distinct profiles of military children following a parental deployment that uniquely related to parents' current PTSD symptoms. This study used a novel approach to studying the relationship

between parental mental health, deployment, and children's mental health, and highlights the importance of considering how deployment may continue to affect parent's functioning in the years following a return. These findings suggest that it may be important to continue to offer services to Service members and their spouses in the years following a return from a deployment, since there may be a small subset of parents that continue to struggle, ultimately impacting the emotional and behavioral health of the children in the family.

Phase II: Differential Effects of a Military Parenting Program on Child Internalizing and Externalizing Behavior

The emotional and behavioral health of military children who have experienced parental deployments during the Global War on Terrorism (GWOT) has been studied extensively since 2001 (e.g., Foran et al., 2017; Lester et al., 2010; Mustillo et al., 2016). Deployments can take a toll on military families, with evidence suggesting that children who are currently experiencing or who have recently experienced a parental deployment are at increased risk for adjustment problems relative to children who did not experience a parental deployment during the same period, including externalizing behavior (e.g., Foran et al., 2017; Gorman et al., 2010) and internalizing symptoms (Mustillo et al., 2016; Pexton et al., 2017). Additionally, these problems may persist for a portion of military children years after a parent's return from a deployment (see Phase I findings). Emotional and behavioral problems in childhood have been linked to a host of negative outcomes through adolescence and into adulthood, including substance abuse, criminal offending, and mental health disorders (e.g., Fergusson, Horwood, & Ridder, 2005; Thompson et al., 2011). Furthermore, children who exhibit co-occurring emotional and behavioral problems tend to show more pronounced impairment than those with single diagnoses (Nottelmann & Jensen, 1999) and comprise over a third of the psychiatric cases diagnosed in children and adolescents in a given year (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), suggesting a large portion of children may be at particularly high risk of sustaining negative outcomes into adulthood.

Effects of Deployment on Children's Mental Health

The extant literature on children from military families involved in the most recent conflicts abroad have suggested that these children are at greater risk for negative outcomes in multiple domains of emotional and behavioral functioning than same-aged military and civilian peers who have not experienced a parental combat deployment (e.g., Sullivan et al., 2015; Wadsworth et al., 2016). For example, Hisle-Gorman et al. (2015) found that children who experienced a recent parental deployment were significantly more likely to be seen for mental health concerns in the year following their parents return than a comparison group of military children who did not experience a parent deploying within the last year. Flake et al. (2009) identified 32% of their sample of children with a parent currently deployed as "at risk" for mental health issues, a proportion much higher than a previous assessment done with the same measure on a non-deployed military sample prior to the Gulf War (Walker, LaGrone, & Atkinson, 1989). However, despite these findings, it is still unclear to what extent deployment is related to the increases in psychopathology in military children: a meta-analysis by Card et al. (2011) found only a small to medium effect of deployment on psychopathology during middle childhood, which suggests factors other than the experience of a parental deployment itself may be responsible for an increase in problem symptoms. One possible mechanism through which deployment may affect children's mental health is through its effect on parenting.

Theoretical Framework

Coercion theory suggests that stressful family transitions negatively affect parenting, leading to increased rates of coercive parent-child interactions which escalate over time as the child's antisocial behavior strengthens (Patterson, 1982). This model was

later expanded to include the impact of positive parenting behaviors, and re-named social interaction learning theory (SIL; Patterson et al., 1990), and has been further extended to include deployment as a family stressor (Gewirtz et al., 2017a). SIL presents a developmental, sequential-stage model for the progression of antisocial behavior beginning in childhood and continuing through adolescence. In the first stage, coercive interactions within the family lead to an increase in child antisocial and externalizing behavior. In the second stage, antisocial youth opt into deviant peer groups during middle childhood and early adolescence, where increasingly deviant peers and continued deviancy training account for the development of more serious acts of antisocial behavior, including violence and arrests (Patterson, 2016).

Parent training programs aim to disrupt this antisocial progression during the first stage described above. One preventive intervention theoretically based on SIL, known as Parent Management Training-Oregon Model (PMTO; Patterson, 2005), has been shown to be successful at reducing child behavior problems with a variety of populations over the last 30 years, including divorced single mothers and new stepfamilies (Bullard et al., 2010; Forgatch, Patterson, Degarmo, & Beldavs, 2009) and has been successfully implemented at the national level in Norway, Iceland, the Netherlands, and statewide in Michigan and Kansas (Bekkema, Wiefferink, & Mikolajczak, 2008; Forgatch, Patterson, & Gewirtz, 2013; Ogden & Hagen, 2008; Sigmarsdóttir, Degarmo, Forgatch, & Guðmundsdóttir, 2013).

PMTO has recently been used with military families. After Deployment Adaptive Parenting Tools (ADAPT; Gewirtz et al., 2014), originally developed as a group-based, preventive intervention, was adapted from an existing PMTO program (Parenting

Through Change; Forgatch & DeGarmo, 1999) and designed to reduce child behavior problems by bolstering parenting skills in five key areas: family problem solving, monitoring, limit setting, encouragement, and positive parent involvement. ADAPT is now available in multiple program formats. Modifications were made for military families who experienced a deployment, including the addition of emotion coaching (i.e. teaching children how to label, process, and problem solve their own emotions) and mindfulness techniques to strengthen parents' emotion regulation capacities (Gewirtz et al., 2014). Previous research with ADAPT has shown that the intervention improved parenting practices at one year follow-up, which was, in turn, associated with improvements in child adjustment (Gewirtz et al., 2017a). However, it is unknown whether the intervention is equally effective at reducing internalizing and externalizing behavior across a range of initial levels of child symptoms. Previous research on parenting interventions has shown that youth with co-occurring emotional and behavioral problems (such as anxiety and conduct disorder) evince greater improvements following parent-focused interventions compared to youth with a single diagnosis (e.g., Beauchaine et al., 2005; Kazdin & Whitley, 2006).

A key to better understanding under what conditions intervention is most successful may lie in examining how differing levels of baseline symptoms interact with parent participation in a parenting program, resulting in changes in children's mental health. The current study utilized the distinct profiles established in phase I of co-occurring internalizing and externalizing behavior in military children who had previously experienced a parental deployment in order to assess whether a preventive parenting intervention differentially effects mental health symptoms in children following

parent assignment to the intervention. In line with previous research, the author hypothesized that random assignment to ADAPT would result in differential treatment effects, with children evincing the highest level of co-occurring symptoms at baseline showing the greatest improvements in internalizing and externalizing behavior at one-year follow-up.

Method

Participants and Procedures

From 2011 to 2014, families were recruited through word-of-mouth, flyers, direct mailings, and outreach to professionals working with military families. The most successful recruitment efforts included a mass mailing through the Department of Veteran's Affairs (VA) and connecting with families at each military-sponsored events during the recruitment period. These events, to which participation is mandatory for troops, were designed to prepare Service members and their families prior to deployment, provide resources to families during deployment, and deliver information about reintegration 30-, 60-, and 90-days following a deployment. Families were eligible to participate if (1) they lived within one hour of the Twin Cities, St. Cloud, Rochester, or Duluth, Minnesota, (2) at least one parent had been deployed overseas in support of OEF/OIF/OND, and (3) they currently had a child between the ages of four and 12 years old.

Parents were directed to complete a short online screener, where, if they were found to be eligible, they could then electronically sign the consent form. They were then automatically sent to a HIPAA-compliant website to complete their baseline online survey. Study staff next contacted families in order to schedule their first in-home

interview, where multiple forms of data were collected, including self-report, observation of family interactions, physiological responses to stress, and genetic profiles on each parent participating and one target child randomly selected from within the study age range. Parents each received a $25 gift card for completing the online survey, families received $50 for completing the in-home interview, and children received a small gift.

Following their in-home assessment, 60% of families were randomized to participate in the After Deployment Adaptive Parenting Tools (ADAPT) intervention, and 40% to services-as-usual, which consisted of a collection of web-based parenting resources. Families randomized to the ADAPT intervention were invited to a 14-week multi-family parenting group program. Groups (with four to 15 participants) were delivered at various locations across Minnesota, and families were provided dinner and childcare. Two to three trained facilitators delivered the manualized content using a combination of verbal instruction, role-plays, discussion, and videos. Additionally, parents were given home practice assignments each week in order to practice skills learned in sessions at home. Sessions were videotaped in order to ensure fidelity of implementation (Knutson, Forgatch, Rains, & Sigmarsdóttir, 2009), with facilitators receiving weekly coaching from a certified PMTO specialist. Follow-up interviews were conducted at 6-, 12- and 24-months post-baseline, with 82% of the sample retained through study completion (see figure 2, CONSORT chart). The present study used data collected at baseline and 12-month follow-up. The final sample consisted of 336 families, including 313 mothers, 294 fathers, 336 children, and 264 teachers (see Tables 5 and 6 for full demographic information).

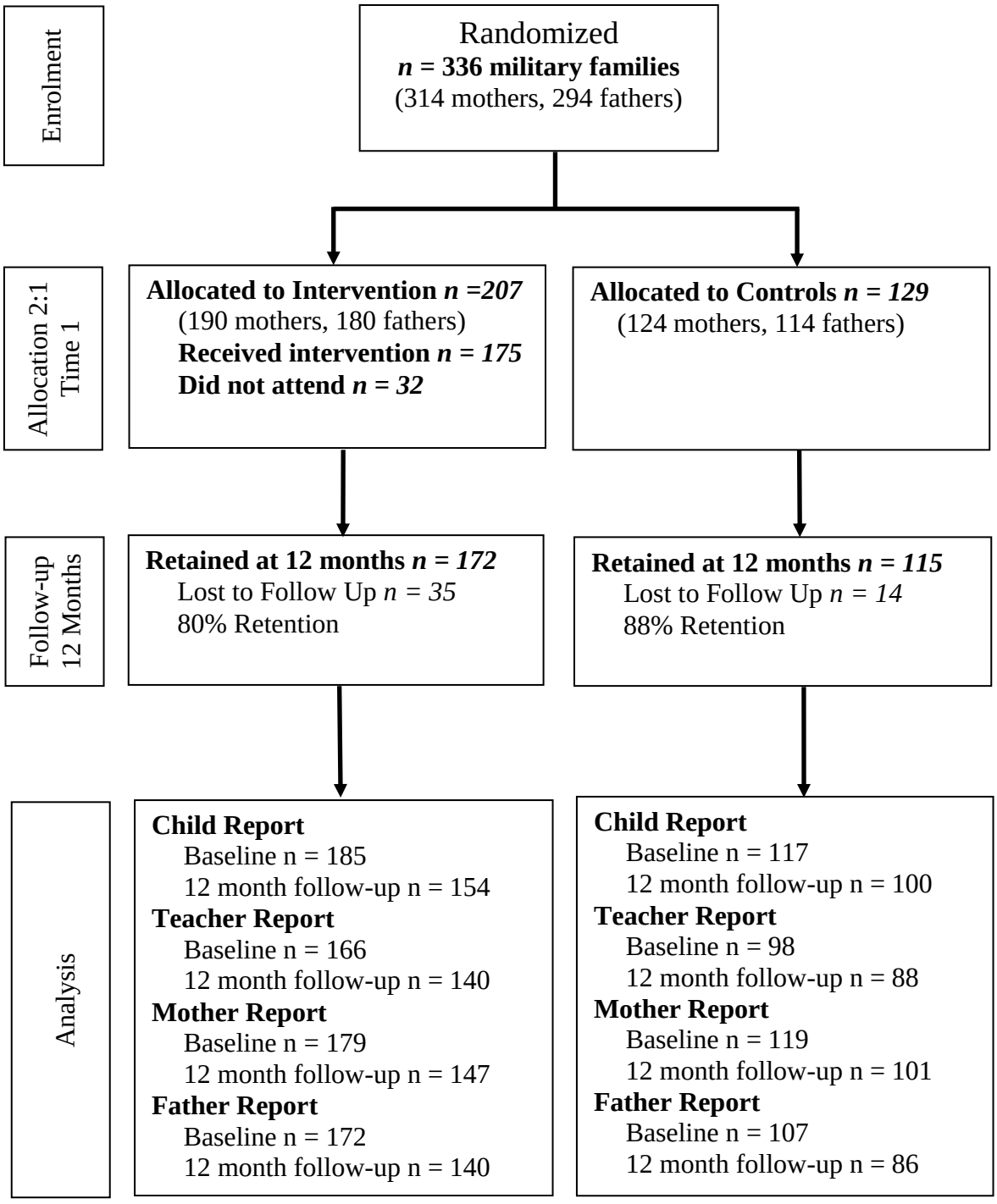


Figure 2. CONSORT diagram of ADAPT.

Table 5

Demographic Information for Children in ADAPT (n = 336)

	n	%	*M (SD)*
Gender			
Female	179	53.3	
Male	157	46.7	
Age			8.33 (2.48)
Race			
Asian	6	1.8	
Black	7	2.1	
White	266	79.2	
Other	8	2.4	
Mixed Race	17	5.1	
Missing	32	9.5	
Ethnicity			
Hispanic	20	6.0	

Table 6

Demographic Information for Parents in ADAPT

	Mothers (*n* = 313)		Fathers (*n* = 294)	
	M (SD)		*M (SD)*	
Age	35.67	(5.89)	37.76	(6.54)
	n	%	*n*	%
Race/Ethnicity				
White or Caucasian	290	92.7%	260	88.4%
Asian	5	1.5%	7	2.4%
Black or African American	7	2.2%	15	5.1%
Mixed Race	7	2.2%	6	2.0%
Other	4	1.3%	2	0.7%
Missing	3	1.0%	0	0.0%
Ethnicity				
Hispanic	10	3.1%	10	2.9%
Household Income[a]				
Less than $39,999	46	13.8%		
$40,000-79,999	146	43.5%		
$80,000-119,999	95	28.2%		
Over $120,000	49	14.5%		
Education				
Some high school or less	2	0.6%	0	0.0%

GED	2	0.6%	6	2.0%
High school diploma	20	6.4%	18	6.1%
Some college	70	22.4%	76	25.9%
Associates degree	55	17.6%	50	17.0%
4 year college degree	120	38.3%	101	34.4%
Master's degree	35	11.2%	29	9.9%
Doctoral or professional degree	6	1.9%	7	2.4%
Missing	3	1.0%	0	0.0%
Marital Status				
Never married	14	4.5%	3	1.0%
Married	276	88.2%	256	87.1%
Divorced	15	4.8%	20	6.8%
Separated	4	1.3%	8	2.7%
Widowed	1	0.3%	0	0.0%
Missing	3	1.0%	7	2.4%
% Deployed Overseas Since 2001	57	18.2%	282	96.0%

[a] Household income was determined based on mother's report unless no mother participated in study, in which case father's report was used

Measures

Externalizing Behavior. Parents and teacher reports of the aggression, conduct problems, and hyperactivity *T* score subscales from the Behavioral Assessment Scale for Children (BASC-2; Reynolds & Kamphaus, 2004) were used to assess externalizing behavior in children (ages 4 to 11) and adolescents (ages 12+). Items were rated on a four-point scale of frequency (*0 = never, 1 = sometimes, 2 = often, and 3 = almost always*). Sample items included, "is unable to slow down," "hits other children/adolescents," "steals," and "uses illegal drugs." The number of items in each subscale varied by child age, ranging from eight to 14 items each. The subscales demonstrated adequate internal consistency across reporter, time, and age group for each of the three subscales (aggression α range = .74-.90; conduct problems α range = .72-.87; hyperactivity α range = .65-.94). *T* scores were then averaged across mother, father, and

teacher reports in order to create a single score of aggression, conduct problems, and hyperactivity for each child. If a parent or teacher report was missing, a score was averaged across the remaining one or two reporters.

Internalizing Behavior. Child report of the anxiety and depression *T* score subscales from the BASC-2 (Reynolds & Kamphaus, 2004) were used to assess internalizing behavior in young children (ages 4-7), middle-aged children (ages 8-11), and adolescents (ages 12+). The young children were asked yes/no questions by an interviewer, while the middle-aged children and adolescents completed self-reports on a four-point scale of frequency (*0 = never, 1 = sometimes, 2 = often, and 3 = almost always*). Sample items included, "I always worry about everything," "I feel depressed," and "I get nervous a lot." The number of items in each subscale varied by child reporter age, ranging from 10 to 13 items each. The subscales demonstrated adequate internal consistency across time and age groups (anxiety α range = .61-.86, depression α range = .72-.80).

Covariates. Treatment was coded 1 for assignment to the ADAPT intervention and 0 for controls. Child gender was coded 1 for male and 2 for female. Child age was computed from date of birth.

Missing Data

Missing data were handled in Mplus using full-information maximum likelihood (FIML; Johnson & Young, 2011), which uses all available observed values in order to compute estimates of missing values. Individuals who only completed the baseline

interview were excluded from outcome analyses and were therefore not included in the likelihood estimates for missing cases.

Analytic Plan

Data cleaning and preparation was conducted in SPSS Statistics 22 (SPSS IBM, New York, U.S.A). Latent profile class enumeration is described in detail above (see Phase I: Analytic Plan).

Latent profile membership was used to predict child mental health outcomes using intent-to-treat (ITT) analysis. An ITT approach involves including all participants randomized to an intervention, including those who never attended, in analyses of the intervention's efficacy in order to provide an unbiased comparison between the intervention and control group (Lachin, 2000). One challenge with including distal outcomes (i.e., child mental health symptoms at 12-month follow-up) in a mixture model is that there is no distinction between the indicators (i.e., baseline child mental health symptoms) and the outcome, so in essence, the outcome is treated as another indicator and can alter class assignments. One solution to this problem is to use the BCH approach (Bakk & Vermunt, 2016; Bolck, Croon, & Hagenaars, 2004) to yield unbiased estimates of the class differences in the distal outcome. A BCH approach computes the average classification error for each individual corresponding to every class as a way of holding class membership stable prior to entering an outcome into the model, and is currently considered the optimal solution for predicting distal outcomes from latent profile membership (Asparouhov & Muthén, 2015). The author then used multiple regression to

test for differential treatment effects by latent profile membership on anxiety, depression, aggression, conduct problems, and hyperactivity at 12-month follow-up.

Results

Means and standard deviations for internalizing and externalizing behavior are presented in Table 7 by group condition and latent profile and are provided here for descriptive purposes only. Descriptive statistics for BASC subscales for the sample are shown in Table 8. Correlations for all variables are presented in Table 9.

Table 7

Means and Standard Deviations for Study Variables (T scores) by Group Condition and Latent Profile

	Controls (*n* = 129)				ADAPT Intervention (*n* = 207)			
	Baseline		12-month Follow-up		Baseline		12-month Follow-up	
	M	SD	*M*	SD	*M*	SD	*M*	SD
Low Internalizing/Externalizing								
Anxiety	51.67	10.46	45.32	8.62	52.30	12.08	46.37	9.32
Depression	47.25	4.91	46.66	10.06	48.10	7.85	48.26	10.68
Hyperactivity	48.18	4.79	47.85	5.44	47.62	4.51	47.47	6.12
Aggression	46.43	3.64	47.72	4.55	45.78	3.54	46.14	4.73
Conduct Problems	46.80	3.60	48.29	5.94	45.49	3.56	45.62	5.43
Mid Internalizing/Externalizing								
Anxiety	57.44	10.87	50.00	9.60	57.66	12.36	49.51	11.26
Depression	51.58	6.83	53.49	13.29	52.79	8.15	54.33	14.92
Hyperactivity	57.82	6.55	55.71	7.02	57.26	6.46	55.81	7.95
Aggression	54.64	4.72	53.01	7.34	54.59	4.98	52.12	5.84
Conduct Problems	54.31	4.37	54.51	7.88	53.74	4.04	51.88	6.13
High Internalizing/Externalizing								
Anxiety	70.47	7.85	51.61	6.40	59.16	10.29	44.55	6.07
Depression	60.92	7.6	45.99	5.76	54.95	8.72	48.58	8.22
Hyperactivity	74.08	6.04	67.47	14.03	74.30	8.39	70.83	9.09
Aggression	71.53	5.95	63.98	11.07	75.05	8.96	64.33	11.58
Conduct Problems	68.88	9.12	62.96	11.60	67.19	9.77	63.34	9.74

Table 8

Descriptive Statistics for BASC-2 Subscales (Percent of Sample with T score >60)

	Baseline	12-Month Follow-up
Anxiety	34.1	13.4
Depression	9.9	16.9
Hyperactivity	17.7	17.8
Aggression	10.5	8.7
Conduct Problems	6.6	9.6

Table 9

Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Treatment Group	1.00	-	-	-	-	-	-	-	-	-	-	-
2. Child Age	-.09	-	-	-	-	-	-	-	-	-	-	-
3. Child Gender	-.01	-.04	-	-	-	-	-	-	-	-	-	-
4. Baseline BASC–Anxiety	-.01	.22**	-.03	-	-	-	-	-	-	-	-	-
5. Baseline BASC–Depression	.04	-.16**	-.10	.63**	-	-	-	-	-	-	-	-
6. Baseline BASC–Hyperactivity	-.06	-.10	-.28**	.16**	.27**	-	-	-	-	-	-	-
7. Baseline BASC–Aggression	-.02	-.10	-.24**	.14*	.22**	.68**	-	-	-	-	-	-
8. Baseline BASC- Conduct Problems	-.10	-.16**	-.19**	.19**	.24*	.65**	.75**	-	-	-	-	-
9. 12-month follow-up BASC- Anxiety	-.01	-.18**	.01	.33**	.38**	.17**	.10	.17**	-	-	-	-
10. 12-month follow-up BASC–Depression	.05	-.49**	-.02	.01	.30**	.16*	.11	.16**	.80**	-	-	-
11. 12-month follow-up BASC–Hyperactivity	-.02	-.22**	-.29**	.13*	.24**	.76**	.56**	.53**	.20**	.24**	-	-
12. 12-month follow-up BASC–Aggression	-.10	-.14*	-.27**	.13*	.17**	.55**	.69**	.55**	.13*	.17**	.73**	-
13. 12-month follow-up BASC- Conduct Problems	.17**	-.09	-.22**	.18**	.20**	.48**	.47**	.57**	.14*	.12	.63**	.67**

Note**.** Male was reference group for gender. *$p < .05$; **$p < .01$.

No significant associations were found between treatment group and any baseline child internalizing or externalizing behavior, suggesting that randomization was successful. Latent profile enumeration and final model selection were conducted previously (for full model fit information and selection criteria, see phase I analytic plan), resulting in a three-profile solution of children's mental health (see Figure 1). The largest profile (50.1%), *Low Internalizing/Externalizing,* consisted of children who, on average, scored below the mean (*T* score of 50) on four of the five indicators (excluding anxiety). The second largest profile (45.7%), *Mid Internalizing/Externalizing,* consisted of children who scored within a standard deviation of the cut-off for moderate risk behavior (*T* score of 50-60). The final profile (4.0%), *High Internalizing/Externalizing,* consisted of children who scored above the cut-off for moderate or significant risk behavior (*T* score of 60+) on four of the five indicators (excluding depression).

Differential treatment effects were observed for two of the five internalizing and externalizing behavior outcomes (see Table 10). First, children with parents assigned to the ADAPT intervention who were classified as High Internalizing/Externalizing at baseline exhibited significantly lower anxiety scores at 12-month follow-up relative to the control group ($\beta = -.58$, $p < .01$). Second, children with parents assigned to the ADAPT intervention group who were classified as Low Internalizing/Externalizing at baseline exhibited significantly lower conduct problems scores at 12-month follow-up relative to the control group ($\beta = -.27$, $p < .01$). No differences were observed according to treatment status for depression, aggression, or hyperactivity.

Table 10

Standardized Beta Coefficients for ITT Predicting 12-month Child Internalizing and Externalizing Behavior Outcomes by Latent Profile

	Treatment Effect	
	B	*SE*
Anxiety (n = 253)		
Low Internalizing/Externalizing	0.08	0.10
Mid Internalizing/Externalizing	-0.05	0.10
High Internalizing/Externalizing	-0.58**	0.22
Depression (n = 253)		
Low Internalizing/Externalizing	0.09	0.10
Mid Internalizing/Externalizing	0.01	0.10
High Internalizing/Externalizing	0.22	0.30
Aggression (n = 275)		
Low Internalizing/Externalizing	-0.20	0.11
Mid Internalizing/Externalizing	-0.07	0.10
High Internalizing/Externalizing	0.04	0.31
Conduct Problems (n = 275)		
Low Internalizing/Externalizing	-0.27**	0.10
Mid Internalizing/Externalizing	-0.17	0.10
High Internalizing/Externalizing	0.04	0.31
Hyperactivity (n = 275)		
Low Internalizing/Externalizing	-0.05	0.11
Mid Internalizing/Externalizing	0.01	0.10
High Internalizing/Externalizing	0.18	0.31

Note**.** ** $p < .01$.

Discussion

The goal of this study was to better understand the effect of a preventive parenting intervention on varying levels of baseline child mental health symptoms in a sample of military families who had experienced a deployment. Specifically, it was hypothesized that random assignment to ADAPT would result in differential treatment effects, with children exhibiting the most symptoms in multiple domains at baseline showing the greatest improvements in internalizing and externalizing behavior at 12-month follow-up. The test of this hypothesis was conducted by assessing whether parent assignment to the ADAPT intervention differentially affected which profiles improved in internalizing and externalizing behavior at 12-month follow-up.

Two significant findings emerged when assessing whether parent assignment to the ADAPT intervention had differential effects on children's 12-month internalizing and externalizing behavior according to their baseline classification into a co-occurring internalizing/externalizing profile or a normative profile. First, children whose parents were assigned to the ADAPT intervention and who were classified to the high-risk co-occurring internalizing/externalizing profile demonstrated significantly lower anxiety symptoms at 12-month follow-up relative to the control group. This is notable because anxiety has rarely been included as a target in previous evaluations of parent training programs (Forehand, Jones, & Parent, 2013). While internalizing symptoms are not commonly addressed in the SIL stage model, there is evidence that children of parents who model appropriate levels of control over their children are more likely to exhibit fewer internalizing symptoms in response to stressful life events (e.g., Utržan, Piehler,

Gewirtz, & August, 2017). In previous research, ADAPT has been shown to improve parents' locus of control, a measure of parents' confidence in their ability to parent effectively, which has, in turn, led to improvements in children's peer adjustment (Piehler, Ausherbauer, Gewirtz, & Gliske, 2016). It is promising to find ADAPT intervention effects on anxiety given the particular salience of worry to children during the post-deployment period, when uncertainty over a parent having to leave again is ever present (e.g., Huebner et al., 2007; Lester et al., 2010), and is especially encouraging given the modifications made when adapting PMTO for military families. Emotion socialization strategies for both parents and their children were purposefully included as a core component of the ADAPT curriculum to address the worry and anxiety that accompanies deployment. Future versions of PMTO developed for populations beyond the military may also benefit from the inclusion of emotion socialization strategies to expand the utility of the program beyond the common target of the reduction of problem behaviors. This finding should be considered preliminary, however, given that the High Internalizing/Externalizing profile only contained about 4% of the sample. While this was likely the result of a predominantly low risk sample of middle-income, well-educated parents and assessments conducted an average of almost three years since the last parental deployment thereby minimizing the number of families still struggling post-deployment, it means this finding should be interpreted with caution.

Secondly, children whose parents were assigned to the intervention group and who were classified to the low co-occurring internalizing/externalizing profile demonstrated significantly lower conduct problems at 12-month follow-up relative to the control group.

This effect was driven by an average increase in conduct problems for the control group while the level of conduct problems in the intervention group remained approximately the same as the baseline level. This finding was unanticipated given that it occurred for the group already considered to be at lowest risk for conduct problems, and represents a hallmark goal of preventive intervention programs: to sustain current functioning and prevent the onset of problem behavior (e.g., Coie et al., 1993). Similar patterns have emerged in previous studies of PMTO-based interventions, where the intervention group exhibited stability in externalizing behavior over time while the behavior of the control group deteriorated over the same period (e.g., Beldavs, Forgatch, Patterson, & DeGarmo, 2006; Martinez & Forgatch, 2001). While the majority of children in military families may be less likely to exhibit problem behavior as time passes since their last parental deployment, it is likely that some children in the Low and Mid Internalizing/Externalizing profiles at baseline resided in families where they were being exposed to ineffective parenting, and may have been at the beginning of the antisocial progression detailed in social interaction learning theory. This finding suggests that even children considered to be at low risk for the development of externalizing behavior may benefit from parent participation in ADAPT.

While no effects were found for the remaining three indicators (depression, hyperactivity, and aggression) or for the mid-level internalizing/externalizing group, there is some evidence to suggest that PMTO effects grow over time. Results from the Oregon Divorce Study (ODS; Forgatch et al., 2009) revealed the effect sizes for child-reported internalizing symptoms and teacher-reported externalizing symptoms grew over

the first 30 months following baseline (DeGarmo, Patterson, & Forgatch, 2004). This suggests enduring treatment effects, where families in the treatment group tend to continue improving, while those in the control group stay the same or get worse, and indicates that greater treatment effects may emerge with the ADAPT study when tested at 24-month follow-up.

This study had a few limitations. First and foremost, the High Internalizing/Externalizing profile only consisted of 11 children with complete baseline and follow-up data, therefore, when broken down into comparisons between the intervention and control group, each cell consisted of only five or six individuals. Caution should be taken when interpreting the significant finding of differences at follow-up given the small sample size, which could have been driven by outliers. Second, the sample was predominantly white and middle-class, which, while reflective of the Minnesota NG/R community, may not generalize to Active Duty or more diverse military populations. Future replication studies should endeavor to recruit a larger sample that is more representative of the military overall.

Conclusion and Implications

The current study highlights the complexity of treatment effects and the need for further research on the impact of preventive interventions on differing levels of initial symptoms. Without the use of distinct subgroups of children presenting with varying levels of mental health symptoms at baseline, it is likely the differential treatment effects on anxiety and conduct problems would have been overpowered by the lack of significant effects for the other two classes. Understanding under what conditions interventions are

most effective for families is a critical step on the path towards ensuring these programs help as many families exposed to them as possible.

Integrated Discussion and Implications

The complete study demonstrates the importance of assessing profiles of mental health in military children following parental deployment, as correlates and outcomes were found to be differentially associated with varying levels of baseline internalizing and externalizing behavior. In the first research phase, three profiles of military child mental health emerged: two represented behaviors largely within the normative range, while the third profile consisted of children exhibiting both internalizing and externalizing behaviors in the moderate to significant risk range. These classes were expected based on previous research and theory. Contrary to previous research, however, no profiles emerged that consisted of children exhibiting only internalizing or externalizing behavior. The author hypothesizes that this is likely due to characteristics of the prevention sample, which overall exhibited lower levels of problem behavior and dysfunction. If this study had been conducted with a clinical sample, it is likely that further profiles of children exhibiting mental health symptoms would have emerged, as has been seen in previous studies conducted with higher-risk samples (e.g., Connell & Bullock, 2008).

Deployment was not significantly associated with a probability of membership in either normative profile compared to the at-risk profile. However, children in the Low Internalizing/Externalizing profile had significantly lower odds of having a mother or father that was currently exhibiting PTSD symptoms relative to children in the High Internalizing/Externalizing profile. This suggests that current parent functioning may play a more significant role in children's mental health than a past experience of parental

deployment. From a preventive standpoint, this suggests that parenting programs may also benefit from incorporating components meant to augment parents' own mental health. Mindfulness techniques (i.e., non-judgmentally attending to thoughts, feelings, and memories) have shown success at reducing PTSD symptoms in combat-exposed veterans (Owens, Walter, Chard, & Davis, 2012; Wahbeh, Lu, & Oken, 2011), and have been successfully incorporated into the ADAPT program (Zhang, Rudi, Zamir, & Gewirtz, 2017).

The second research phase extended these findings longitudinally to assess whether assignment of families to a military parenting intervention resulted in differential treatment effects according to a child's baseline profile membership. Results indicated that differential treatment effects were present for two of the five outcomes measured. First, children who were classified to the High Internalizing/Externalizing profile at baseline and whose parents were assigned to the ADAPT intervention had significantly lower anxiety scores at 12-month follow up compared to the control group. This finding of an effect of a PMTO intervention on reducing child anxiety is believed to be the first of its kind, and reflects key changes made to ADAPT to incorporate elements that address the anxiety that is associated with deployment and reintegration (e.g., Huebner et al., 2007; Mustillo et al., 2016; Pexton et al., 2017). Second, children who were classified to the Low Internalizing/Externalizing profile at baseline and whose parents were assigned to the intervention group had significantly lower conduct problems at 12-month follow-up compared with those whose families were assigned to the control group. This finding suggests a true prevention effect, and has been found in other longitudinal

examinations of PMTO where the intervention doesn't always necessarily lead to reductions in problem behaviors, but can also stop the progression of these behaviors relative to a control condition (e.g., Beldavs et al., 2006).

The two research phases together highlight the heterogeneity of military children's adjustment. While the vast majority of the sample exhibited resilience in the years following a parental deployment, there remained a small subset of children who were still at-risk for the negative outcomes that accompany co-occurring disorders identified in childhood, with further indication that these children might have parents who are also still struggling to adjust to post-deployment life. These studies suggest that it may be of particular importance to address emotions in military families: by incorporating components such as emotion coaching and mindfulness techniques, parenting interventions for military families can help parents to not only address their own emotions, but to learn how to teach their children to appropriately identify and process emotions as well.

Conclusion

These studies offer preliminary evidence that there may be a subgroup of children who continue to struggle with internalizing and externalizing symptoms in the years following a parental deployment. Furthermore, these studies addressed two identified gaps in the literature: first, different profiles of mental health at baseline were identified, one of which was typified by clinically significant rates of co-occurring internalizing and externalizing behavior. This is important because it is among the first evidence that some military children may suffer from high-symptom levels in multiple domains of

functioning, which has implications for their treatment and long-term outcomes. Second, differential treatment effects on 12-month mental health outcomes according to profile membership were found, which suggests that treatment may affect families differently, and that treatment effects for smaller subgroups may be missed altogether if a sample is treated as if each individual is affected by risk factors and outcome variables in a homogenous manner. The findings from this dissertation suggest that more person-centered analyses should be undertaken with military families in the future, as we begin to better understand the ways in which these families are different from one another, rather than approaching each inquiry with an assumption that they operate the same. Only then will we be able to attain the ultimate goal of providing preventive programs tailored to each families' needs in the hope of giving each family the greatest chance of positive, sustained adaptation post-deployment.

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